And hence the specific gravity of mercury at 62° F., as compared with water at the same temperature, will be 13·569 nearly.

Again, if we assume the correctness of Regnault's Table of the absolute dilatation of mercury, and also that of Despretz's Table of the absolute dilatation of water, we shall find that the weight at 32° F. of a volume of mercury weighing 13590·86 grs. at 62° F. will be

$$13590{\cdot}86 \times 1{\cdot}00298 = 13631{\cdot}361 \text{ grs.}$$

Also the volume at 4° C., or 39°·2 F., of a volume of water weighing at 62° F. 1001·62 grs., will be

$$1001{\cdot}62 \times 1{\cdot}0011437 = 1002{\cdot}766 \text{ grs.}$$

Hence the specific gravity of mercury, according to the French method of determining it, will be

$$\frac{13631{\cdot}361}{1002{\cdot}766} = 13{\cdot}594.$$

A determination by Regnault gives 13·596.

These two results agree very nearly with one another; and this agreement tends not only to verify the correctness of Regnault's determination, but to show that Regnault's Table of the dilatation of mercury, and Despretz's Table of the dilatation of water, agree together; a remark that had been previously made by Dr. Matthiessen in a paper which he recently presented to the Society.

II. "On the Forms of Graphitoidal Silicon and Graphitoidal Boron." By W. H. Miller, M.A., For. Sec. R.S., and Professor of Mineralogy in the University of Cambridge. Received February 1, 1866.

Graphitoidal Silicon.

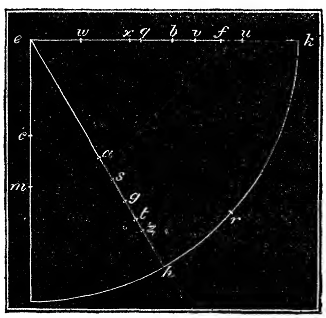
It has been so confidently assumed that graphitoidal silicon is an allotropic condition of silicon crystallized in octahedrons, that on ascertaining by measurement of angles that some graphitoidal silicon given me by Dr. Matthiessen was in simple and twin octahedrons, I at once concluded that the substance had been wrongly named. Later, however, I obtained from Dr. Percy a supply of graphitoidal silicon of unquestionable authenticity. Its lustre was that of the crystals I had previously examined. It occurred in small scales, having for the most part the appearance of crystals of the oblique system. On measurement, however, they proved to be octahedrons in which two parallel faces were much larger than any of the other faces, and two other parallel faces were either too small to be observed or were altogether wanting. One of the scales had all the faces of a twin octahedron. It appears, then, that there is no reason, founded on a difference of form, for separating graphitoidal from octahedral silicon, the sole

distinction being that the crystals of the latter are more perfect than those of the former.

Graphitoidal Boron.

The forms of boron have been described by the Commendatore Quintino Sella in two papers read before the Royal Academy of Turin on the 4th of January and the 14th of June, 1857, and by the Baron Sartorius v. Waltershausen in a paper presented to the Royal Society of Göttingen on the 1st. of August of the same year. They found independently that the adamantine boron of Wöhler and Deville, containing a variable and not inconsiderable amount of aluminium and carbon, considered by Sella as possibly a definite compound of boron with aluminium and carbon with a mechanical mixture of pure boron, crystallizes in forms belonging to the pyramidal system.

Boron containing 2·4 per cent. of carbon, the boro semplice of Sella, is described by him as occurring in crystals, the faces of which are not so perfect as to admit of a very accurate determination of the angles they make with one another. The angles approximate to some of the angles of crystals of the cubic system, but the aspect of the crystals, which are usually twins, leads to the supposition that they belong to the oblique system, and that the angle between the oblique axes differs but little from 90°.



The forms observed by Sella, considered as belonging to the oblique system, are:—

k 1 0 0, e 0 0 1, c 0 1 3, m 0 2 3, b 1 0 1, n $\bar{5}$ 0 4, p 5 0 8, q 2 0 3, f $\bar{2}$ 0 1,
h 1 1 0, r 2 1 0, g 1 1 1, a $\bar{1}$ 1 2, d $\bar{2}$ 1 1, l 2 1 2.

Of these, I have since reobserved all, with the exception of *a, d, l,* and perhaps *p*, the corresponding reflexion being too faint to enable me to affirm the existence of that face in the crystals I examined. I have also observed the following forms in which the distribution of the faces is in most cases, probably in all, the same as in the prismatic system, or as if the oblique form $h\,k\,l$ were always accompanied by the oblique form $\bar{h}\,k\,l$:

u 3 0 1, w 1 0 4, v 4 0 3, x 3 0 5, s 2 2 3, t 3 3 2, z 2 2 1.

On the same supposition regarding the distribution of the faces, the an-

nexed figure represents an octant of the sphere of projection, the poles of some of the faces not wanted for comparison with those of graphitoidal boron being omitted. The principal angles taken or computed from the angles provisionally adopted by Sella, are :—

	°	′		°	′
e c	39	14	*e k*	90	0
e m	58	31	*k m*	90	0
e w	19	28	*k h*	60	0
e x	40	19	*e a*	54	44
e q	43	21	*e s*	62	4
e b	54	44	*e g*	70	32
e v	62	4	*e t*	76	44
e f	70	32	*e z*	79	59
e u	76	44	*e h*	90	0

Besides the two forms already mentioned, Wöhler and Deville obtained boron in extremely thin scales, which were supposed to be a different modification of boron, and was accordingly called graphitoidal. Sella, however, relying apparently upon the evidence afforded by the lustre and colour of the scales, for he was unable to obtain any measurements, expresses his conviction that they are not different from pure boron. Some scales of this substance, for which, as well as a supply of crystals of pure boron, I am indebted to Dr. Matthiessen, have faces on their edges, but so narrow that the reflected image of the bright signal is diffracted into a line of considerable length, and therefore difficult to bisect. For this reason it is not possible to determine the positions of the faces with accuracy.

One of them, about 2 millims. wide and 0·014 millim. thick, of the shape of half a hexagon divided by a line at right angles to two opposite sides, exhibited faces agreeing in position very fairly, considering the unavoidable errors of observation, with two of the faces *k*, two of the faces *e*, *c*, *m*, three of the faces *b*, two of the faces *x*, *q*, three of the faces *h*, and four of the faces *a*. Another, smaller and thinner, of the shape of a hexagon, had faces coinciding with two of the faces *k*, two of the faces *e*, *c*, *m*, *f*, *v*, and four of the faces *h*. The agreement in position of so many of the faces with those of pure boron appears to leave but little doubt of the identity of the forms of the two substances.